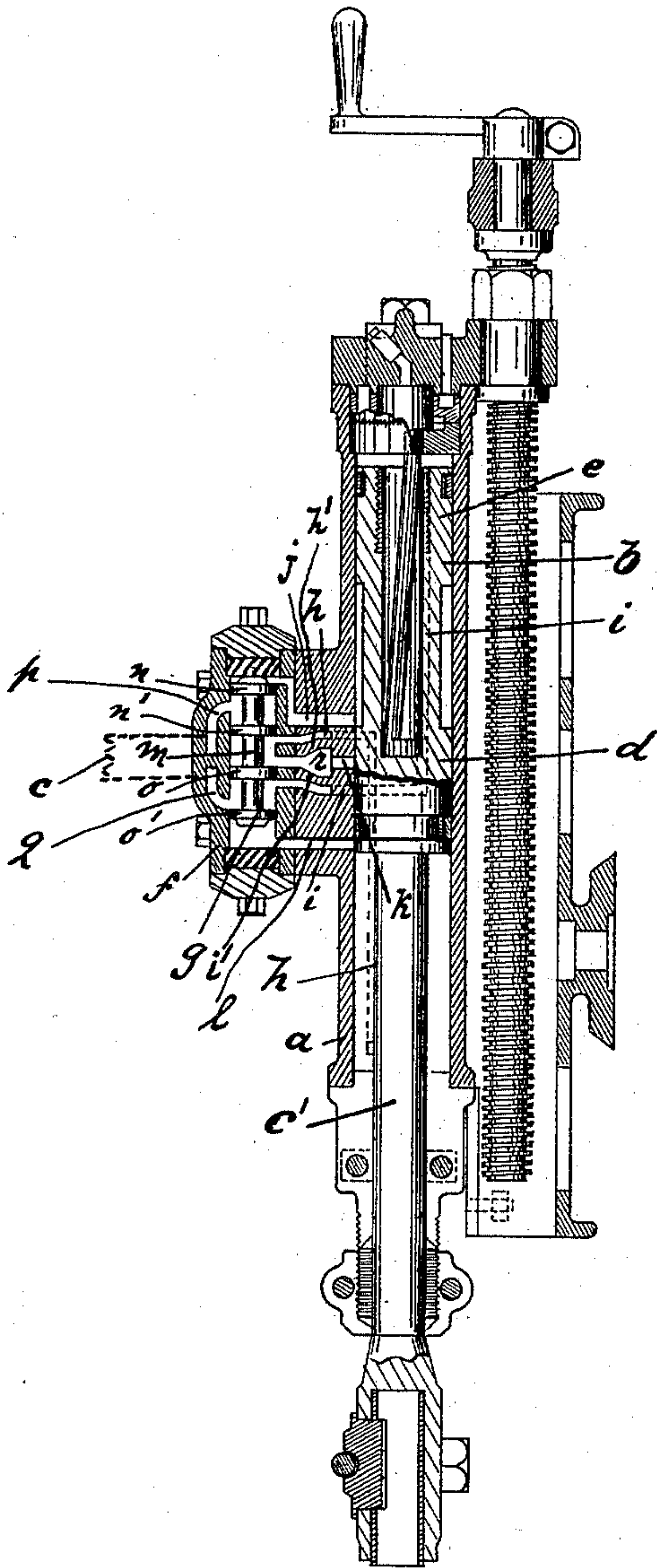


(No Model.)

W. WOOD.  
ROCK DRILL.

No. 497,043.

Patented May 9, 1893.



WITNESSES:

*Wm. D. M. L.*  
*A. M. Robertson.*

INVENTOR:

*Warren Wood*

BY

*Gartner & Co.*

ATTORNEYS



# UNITED STATES PATENT OFFICE.

WARREN WOOD, OF PATERSON, NEW JERSEY, ASSIGNOR TO SAMUEL G. McKIERNAN, OF SAME PLACE.

## ROCK-DRILL.

SPECIFICATION forming part of Letters Patent No. 497,043, dated May 9, 1893.

Application filed December 7, 1892. Serial No. 454,345. (No model.)

*To all whom it may concern:*

Be it known that I, WARREN WOOD, a citizen of the United States, residing in Paterson, county of Passaic, State of New Jersey, have  
5 invented certain new and useful Improvements in Rock-Drills; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable  
10 others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawing, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to a new and useful  
15 improvement in rock drills and particularly to an improvement upon the rock drill shown and described in Letters Patent No. 390,578, of October 2, 1888.

It consists in the novel arrangement and  
20 connection between the steam-chest, the trip valve and the cylinder of said rock drill and the location of the exhaust.

It consists also in the novel combination and arrangement of parts hereinafter more  
25 fully described and claimed.

In the accompanying drawing, which represents a central longitudinal section of the improved rock drill, *a* is the cylinder and *b* the drill rotating piston. The drill carrying  
30 piston *b* has two heads *d* and *e*. On one side of the cylinder *a* is arranged the steam chest *f* containing the trip valve *g*. This steam chest communicates by port *h* with the lower end of the cylinder *a* and by port *i* with the  
35 upper end thereof. Leading from the ends of the steam chest *f* into the cylinder *a* are two ports *l* and *j* designed to convey the compressed air which accumulates between the  
40 cushion *n*<sup>2</sup> and the head *o*' and the cushion *n*<sup>3</sup> and the head *n* of the trip valve respectively, to the space between the heads of the piston *b*. The air passes from thence through central port *k* into the exhaust *r* placed below the trip valve *g*. Said trip valve consists of the piston rod *m* having two series of  
45 double heads *n n'* and *o o'*, arranged to slide upon and alternately open and close the ports in the manner hereinafter described.

Steam enters the steam chest through inlet  
50 *c* and ports *p* and *q*. The ports *h* and *i* are

placed alongside the exhaust *r* and are separated therefrom by the partitions *h' i'* extending into the steam chest above the exhaust *r*.

Supposing the trip valve and drill piston to  
55 be in the position shown in the drawing it will be understood that steam will enter the steam chest through inlet *c* and port *q* and will pass through the chamber formed between the heads *o o'* of the trip valve into  
60 port *i* which leads to the cylinder above the upper head *e* of the drill piston, thus forcing the drill piston downward. The spent steam (from the previous stroke of the piston) which remained in the lower chamber of the cylinder below the lower head *d*, of the drill piston, is then forced back through port *h* into  
65 the steam chest, and passes over the partition *h'* into the exhaust *r*. At the same time the compressed air, which accumulates in the  
70 lower end of the steam chest, that is between the cushion *n*<sup>2</sup> and head *o'* of the trip valve, will escape through the port *l* into the space between the piston heads and from thence through port *k* into the exhaust *r*. In this  
75 position a connection is opened between port *p*, the chamber between heads *n n'* of the trip valve and the port *h* leading to the lower chamber of the cylinder below the lower head *d* of the drill piston. The drill piston is then  
80 thrown upward by steam from the steam chest, the exhaust or spent steam in the upper chamber of the cylinder being forced back through port *i* into the steam chest and will pass over partition *i'* into the exhaust *r*. The  
85 compressed air in the upper end of the steam chest, that is between the cushion *n*<sup>3</sup> and the head *n* of the trip valve, escapes through port *j* into the space between the piston heads and from thence through port *k* into the exhaust *r*.  
90

It is manifest from the description and from the arrangement of parts, that the drill piston is actuated by live steam and that the trip valve is actuated by exhaust as heretofore described.

In the Patent No. 390,578 the trip valve and drill piston are both operated by live steam and piston is adapted to receive a long stroke only, that is a stroke corresponding to the  
100 length of the piston.



Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of a steam chest and its  
5 trip valve, with the cylinder and piston, and  
with ports leading from about the center of  
said steam chest to the ends of the cylinder,  
and with an exhaust placed between said  
10 ports and below their openings into the steam  
chest, and with the end ports leading from  
the ends of the steam chest above the ends of  
the trip valve into the space between the  
heads of the piston, and a port communicat-  
15 ing directly between the exhaust and the  
space between the piston heads, substantially  
as described.

2. In a rock drill, the combination of a  
steam chest and its trip valve, with the cyl-

inder and drill piston, and with two ports  
communicating between the central portion 20  
of the steam chest and the ends of the cylin-  
der, an exhaust placed below the trip valve  
and between said ports, and with ports lead-  
ing from the ends of the steam chest into the  
space between the heads of the piston, and a 25  
port leading from the space between the heads  
of the piston into the exhaust, substantially  
as described.

In testimony that I claim the foregoing I  
have hereunto set my hand this 29th day of 30  
November, 1892.

WARREN WOOD.

Witnesses:

ALFRED GARTNER,  
WM. D. BELL.